

consisting of large nucleated cells." A similar affection is found in this species at St. Andrews and in the Thames, and the same tumours occur on the plaice.

In a male example of the latter, for instance, the coloured surface is crowded with small rounded tumours which resemble shot. They are also attached to the various fins (Pl. XVI. fig. 6) as well as invading the white surface. They are firmly fixed to the skin, give pain when interfered with, and are vascular. The isolated tumours range from 1·7 millim. to 1 millim. or less; the larger masses (Pl. XVI. fig. 6, *a*), when bisected, show a series of smaller areas, the whole being composed of multiple tumours, mostly of the same size (Pl. XVI. fig. 7). In the fresh state section is followed by the exudation of a minute granular whitish creamy substance, and the occurrence of fine fibrillæ under examination indicates that the fluid is probably coagulable. Each chamber is cystic, presenting a firm hyaline wall of considerable thickness, bounding the granular contents. The stroma exterior to the former is chiefly fibro-granular. Smaller cysts in course of development are observed amongst the stroma, the thick translucent hyaline wall being conspicuous. These tumours therefore would appear to differ from the kind with nucleated cells described by Lowe.

#### EXPLANATION OF PLATE XVI.\*

- Fig. 1.* Transverse section of the ovary of *Zoarces viviparus*, shortly after the escape of the embryos. *a*, epithelial coat; *b*, muscular layer; *c*, section of the blood-vessels at the margins of the villi.  $\times$  about 40 diam.
- Fig. 2.* A fragment of the membrane of a villus, showing the large anastomosing vessels. Magnified.
- Fig. 3.* Ova of *Cyclopterus lumpus*. About the natural size.
- Fig. 4.* Ova of *Cottus scorpius*. About the natural size.
- Fig. 5.* Ova of *Liparis Montagu*. About the natural size.
- Fig. 6.* Portion of the anal fin of a small *Pleuronectes platessa*, with a multiple tumour and a few detached masses. About natural size.
- Fig. 7.* Transverse section of the foregoing multiple tumour. Enlarged.

#### XL.—Some new Infusoria from American Fresh Waters.

By Dr. ALFRED C. STOKES.

[Plate XV.]

THE following hitherto undescribed Infusoria were originally met with in shallow ponds in central New Jersey, or were

\* I have to thank Mr. Ed. Prince, Assistant-Zoologist at the Marine Laboratory, for the careful drawings in this Plate.

developed in a more or less concentrated infusion of fallen leaves with water from the Delaware river. They are individuals from an interesting class of animal life particularly abundant in this country, but one whose study has here been almost entirely neglected.

*Heteromita mutabilis*, sp. nov. (Pl. XV. fig. 16.)

Body ovate or subpyriform, about twice as long as broad, very soft, flexible, and changeable in shape, the alterations confined chiefly to the posterior extremity, and consisting of varied pseudopodial extensions of this part, which is normally widest and rounded; endoplasm granular; anterior vibratile flagellum thick, slightly exceeding the body in length, the posterior or trailing one slender, twice to two and a half times that length; nucleus obscure, apparently subspherical, near the centre of the left-hand border; contractile vesicle near the right-hand margin of the posterior extremity. Length of body  $\frac{3}{100}$  inch.

*Hab.* Standing pond-water, with aquatic plants. Movements evenly and steadily forward.

Although this infusorian can assume various shapes apparently at will, it is remarkable for the presence and variety of the posterior protrusions of the body-sarcode. These are usually almost constantly formed during the creature's progression, one scarcely disappearing before its place is taken by another of different shape and length. The tips of these pseudopodial prolongations seem to be adhesive, since they appear to cling to the surface of the glass slide and to require a slight effort for their release. The production of these characteristic prolongations, which, so far as I am aware, have not hitherto been observed in any other species of the genus except *H. lens* (Müll.), S. K., when in a dying condition, together with the posterior location of the contractile vesicle, which, with this exception, is placed so close to the rear in *H. lens* only, are of diagnostic value, and will readily lead to the recognition of the infusorian. From *H. lens*, for which it is hardly possible to mistake it, *H. mutabilis* can be distinguished by its normally ovate or subpyriform contour, but chiefly, apart from the posterior changes of shape, by the diverse length and thickness of the flagella. In *H. lens* the latter are both equal in size and about equal in length, being twice as long as the body.

*Petalomonas carinata*, sp. nov. (Pl. XV. fig. 14.)

Body broadly ovate, somewhat longer than wide, both

extremities rounded, the anterior the narrower; ventral surface concave, the dorsal elevated into a single, median, longitudinal, keel-like projection, traversing the entire body; flagellum not exceeding the body in length, arising from the ventral surface somewhat back of the frontal border; oral fossa capacious; nucleus near the centre of the right-hand margin, the contractile vesicle somewhat in advance, on the opposite side; parenchyma transparent. Length of body  $\frac{1}{1125}$  inch.

*Hab.* Standing pond-water, with aquatic plants.

This form seems to combine the characters of *P. abscissa* (Duj.), Stein, and of *P. mediocanellata*, Stein, the former bearing one or two dorsal keel-like elevations, and the latter having a groove traversing its ventral surface, while *P. carinata* possesses both in a marked degree. The dorsal aspect of the latter is conspicuously angular, the keel-like ridge forming the apex and the right-hand and left-hand sides respectively sloping evenly in opposite directions to the lateral borders, as shown in diagrammatic transverse optic section by fig. 14. The infusorian is much the smallest member of the genus hitherto observed. Its movements are usually directly forward and not rapid, the flagellum conspicuously vibrating only at its distal extremity, the creature frequently coming to rest on a fragment of aquatic plant, and extending the flagellum in all directions, as if in search of food, or, where food seems specially abundant, remaining for a long time with the anterior border or the large oral aperture in contact with the heap of débris, the posterior extremity being lifted upwards, the flagellum then also being directed to various points in the vicinity.

*Zygoselmis acus*, sp. nov. (Pl. XV. fig. 15.)

Body elongate, needle-shaped or subfusiform, changeable in shape, about six times as long as broad, both extremities pointed; surface smooth; endoplasm granular; flagella very diverse in length, the shorter scarcely as long as the body, the longer once and a half to twice that length; nucleus apparently subcentral. Length of body  $\frac{1}{1500}$  inch.

*Hab.* Standing pond-water, with aquatic plants. Movements active.

There seems to be but little dissimilarity between the *Zygoselmis* of Dujardin and Ehrenberg's *Distigma*, the possession by the latter of two eye-like pigment-spots being the chief point of difference, and even these often being absent. In *Zygoselmis* they have not been observed at any stage of

the infusorian's life-history. The form here referred to as *Z. acus* undoubtedly belongs to the genus in which it is now placed. Its ability to change its shape is not often exercised; but when the need arises the alteration is rapid and conspicuous. Its favourite haunt seems to be dead and partially empty algal cells, where several of the species can usually be found in the small pool affected by them.

*Anisonema emarginatum*, sp. nov. (Pl. XV. fig. 11.)

Body suborbicular, depressed, the frontal border somewhat narrowed, rounded, and centrally emarginate, the dorsal surface convex, the ventral slightly concave; flagella subequal in size, the anterior or vibratile about twice as long as the body, the trailing one slightly longer, both inserted near together somewhat toward the right-hand side of the frontal emargination; contractile vesicle single, in the anterior body-half near the right-hand margin; nucleus not observed; endoplasm granular, enclosing numerous dark-bordered linear corpuscles. Length of body  $\frac{1}{1800}$  inch.

*Hab.* Standing water, with *Myriophyllum* and other aquatic plants.

*Entosiphon ovatus*, sp. nov. (Pl. XV. fig. 12.)

Body ovate, somewhat depressed, a little less than twice as long as wide, rounded posteriorly, narrowed anteriorly, and slightly curved toward the ventral aspect, the frontal border somewhat emarginate on the left-hand side, the cuticular surface traversed by ten or twelve longitudinal sulci; the two flagella inserted near together on the left-hand side of the pharyngeal aperture, the posterior or trailing one about twice as long as the body, the anterior or vibratile not exceeding the body in length; pharyngeal tube protrusible, extending backwards for fully four fifths of the entire length of the body; contractile vesicle single, near the left-hand border of the frontal margin; nucleus spherical, near the centre of the left-hand border. Reproduction by longitudinal fission. Length of body  $\frac{1}{900}$  to  $\frac{1}{1000}$  inch.

*Hab.* An infusion of dead leaves.

*Entosiphon sulcatus* (Duj.), Stein, has the trailing flagellum from two to three times as long as the body, the cuticular sulci are but four or five, and the animalcule is very much smaller than the form here described. The contractile vesicle has been observed to become rosette-shaped in *E. ovatus*, as it has in the form from European waters. Reproduction by longi-

tudinal fission, beginning at the anterior border, has been noticed in both.

*Tillina flavicans*, sp. nov. (Pl. XV. fig. 8.)

Body subreniform or bean-shaped, soft and flexible, but persistent in form, holotrichous, minutely roughened and obliquely striate, the anterior and posterior extremities subequal in width, the anterior body-half compressed; oral aperture ovate, obliquely placed near the centre of the right-hand border of the ventral surface; pharyngeal passage long, recurved, entirely ciliate; contractile vesicle single, spherical, on the left-hand margin near the posterior extremity; nucleus spherical, subcentrally located; anal aperture postero-terminal. Length of body  $\frac{1}{500}$  to  $\frac{1}{600}$  inch.

*Hab.* An infusion of dead leaves.

The animalcule's movements are rapidly forward in straight lines or in irregular spirals, commonly with one side or the other downward. The food-particles are usually collected in conspicuous spherical masses, which are carried around the body in a quite constant endoplasmic current. The colour, usually a shade of brown, varies considerably, probably being affected by the colour of the infusion in which the animalcule thrives.

In the 'American Naturalist' for February 1884 the writer referred to a species of this genus under the name of *Tillina inflata*, which was not there described. As it and the preceding somewhat closely resemble each other, *T. inflata* is here diagnosed and a figure given for comparison, although the likeness is confined chiefly to internal structure.

*Tillina inflata*, Stokes. (Pl. XV. fig. 9.)

Body irregularly subreniform, obliquely striate, entirely ciliated, the posterior body-half rounded, inflated, conspicuously widened, and somewhat oblique; the anterior half compressed, its ventral surface flattened; oral aperture ovate, ventral, obliquely placed, and followed by a short, recurved, entirely ciliated pharyngeal passage; nucleus ovate or spheroidal, subcentrally located; contractile vesicle single, spherical, postero-terminal; anal aperture postero-terminal, in close proximity to the pulsating vacuole. Length of body  $\frac{1}{500}$  to  $\frac{1}{600}$  inch.

*Hab.* Water in which the bulbs of the Chinese *Narcissus* were growing.

This interesting creature is found only in the habitat men-

tioned, but always there. Its movements are very similar to those of *T. flavicans*. The food-masses also receive the spherical form; but the rotation of the endoplasm so noticeable in *T. flavicans* is here seldom visible. In colour the infusorian is a deep amber, the tint varying with that of the infusion and, to a certain extent, with age, the young animalcules being paler than the mature. Reproduction takes place by encystment, with subsequent binary or quadruple fission, the young resembling the undivided forms in all except colour. Conjugation has not been observed.

*Lacrymaria truncata*, sp. nov. (Pl. XV. fig. 10.)

Body flask-shaped or clavate, flattened, very soft and flexible, four and one half to five times as long as broad, narrowed into a neck-like region anteriorly, the frontal border of which is somewhat dilated and obliquely truncate, the apical groove conspicuous; the posterior extremity rounded; entire surface strongly and longitudinally striate; cuticular cilia long and fine; oral aperture terminal, followed by a long conical membranous pharynx, visible only after death; apical groove bearing a single row of cilia; contractile vesicle single, spherical, postero-terminal; nucleus long, band-shaped, variously curved and twisted, having several laterally-attached nuclei; anal aperture postero-terminal. Length of body  $\frac{1}{200}$  inch.

*Hab.* Standing water, with dead leaves.

This is the only freshwater member of the genus thus far observed. It is remarkable for the very long and band-like nucleus, and especially for the capacious conical pharyngeal passage, which has hitherto not been recorded as appearing in any of the several marine species. It is here visible only after the animalcule's death, which in this instance was accomplished by the glycerole of tannin, when it becomes conspicuous, and is seen to occupy almost the entire width of the frontal border, thence tapering to an acute termination and extending through about one third of the entire body.

In most of the species the apical extremity is conical; here, however, it is conspicuously flattened, oblique, and truncate. As the infusorian now referred to is undoubtedly a member of the genus *Lacrymaria*, a slight change in the generic diagnosis would seem necessary; and such change would be preferable to the erection of a new generic title for the creature, as might seem desirable on account of the cushion-like apical extremity and the extensively developed pharyngeal passage. The latter probably brings the genus closer to

the *Lagynus* of Quennerstedt, in which the pharynx is plicate and the apical groove wanting. The movements of the infusorian are rapid and usually by rotation on the long axis.

*Colpidium truncatum*, sp. nov. (Pl. XV. fig. 13.)

Body somewhat reniform, from two to three times as long as wide, striate longitudinally, compressed anteriorly, the extremities subequal in width, the posterior one evenly rounded, the anterior somewhat curved toward the ventral aspect, the frontal border obliquely truncate; oral aperture ovate, the pharynx long; vibratile membrane large, conspicuous; contractile vesicle single, located on the right-hand border of the posterior extremity near the dorsal surface; nucleus ovate or subspherical, single, subcentral; anal aperture postero-terminal. Length of body  $\frac{1}{500}$  to  $\frac{1}{600}$  inch.

*Hab.* Standing water, with *Myriophyllum* and other aquatic plants.

This form was for a time very abundant in a small vessel of water from an aquarium containing *Myriophyllum* in various stages of growth and decay. It differs from the hitherto single-known member of the genus in the oblique truncation of the frontal border, the single nucleus, and the position of the contractile vesicle. In numerous instances conjugation was observed, union taking place between the anterior third of the ventral surface of each animalcule. Transverse fission was also repeatedly noticed, the newly-separated animalcules being subspherical in form, soon, however, assuming the normal contour of the adult infusorian.

*Vorticella octava*, sp. nov. (Pl. XV. fig. 17.)

Body conical-campanulate, somewhat changeable in form, once and one half to twice as long as broad, tapering posteriorly, slightly constricted beneath the peristome, which is revolute and exceeds the body-centre in width; obovate or pyriform when contracted; cuticular surface finely striate transversely; ciliary disk somewhat and obliquely elevated; pedicle seven to nine times as long as the body, the hyaline sheath apparently thickened on one margin and twisted about the stout muscular thread; contractile vesicle single. Length of body  $\frac{1}{900}$  to  $\frac{1}{1000}$  inch.

*Hab.* Standing water; attached to *Proserpinaca*. Solitary or few together.

This is not uncommon in the pond where it was originally found, and the peculiar appearance of the sheath about the pedicle seems to be characteristic of the species; in none of

the previously described *Vorticella* has such an apparent twisting of this covering been noted. One border only of the sheath seems to be conspicuously thickened, the spiral line visibly crossing the pedicle and forming a curve on the opposite side, thus producing the twisted aspect. The other margin of the sheath is not distinguishable from the thread when the pedicle is extended, and is apparently then in contact with it.

The body is quite changeable in shape; the usual alteration, besides shortening and widening, is the formation of a deep depression in one side anteriorly, in this habit somewhat resembling *Vorticella smaragdina*, Stokes\*, in which this is usually a conspicuous feature.

As this is the eighth member of the genus found in American waters, and presumably restricted to this continent, the event has been commemorated by compelling the long-stemmed infusorian to bear the ordinal number as its specific title.

*Urostyla trichogaster*, sp. nov. (Pl. XV. fig. 3.)

Body elongate, elliptical, soft, and flexible, three times as long as broad, both extremities rounded, somewhat narrowed anteriorly, and slightly curved towards the left-hand side; upper lip prominent, crescentic; the entire cuticular surface roughened by minute elevations in irregularly longitudinal clusters; peristome-field obovate or subtriangular, extending obliquely backward from the left-hand side of the frontal border towards the right, to somewhat beyond the anterior third of the ventral surface, bearing on the left-hand margin a fringe of large, strong, adoral cirri and a row of fine paroral cilia, the right-hand border supporting a conspicuous undulating membrane and a row of preoral cilia, a series of long fine endoral cilia depending from the median part and continued through the long, narrow, tubular pharynx; the frontal region between the right-hand side of the peristome-field and the body-margin beset by numerous uncinatè styles, gradually decreasing in size posteriorly, but suddenly passing into the fine setæ which clothe the entire ventral surface in closely approximated longitudinal lines; marginal setæ uninterrupted, longest on the posterior border; anal styles slender, subequal, ten to twelve in number, arranged in an oblique row, not projecting beyond the body-margin; contractile vesicle single, spherical, on the left-hand side of the peristome near its posterior extremity; nucleus single, subspherical, posteriorly

\* 'American Naturalist,' 1885, p. 18.



located; anal aperture subterminal. Length of body  $\frac{1}{5}$  to  $\frac{1}{100}$  inch.

*Hab.* A vegetable infusion. Reproduction by transverse fission.

For some time this was the prevailing form in an infusion, gliding over the fungoid slime on the surface as visible whitish spots. By transmitted light it is brown and semi-opaque.

The structure of the peristome is complex, resembling that of the same part in *Gastrostyla Steinii*, Eng. The series of fine "paroral" cilia on the left-hand border of the region, in addition to the large adoral cirri on the same margin, is especially notable, as it has but seldom been observed in any animalcule.

A nucleus does not seem to be invariably present. Only one has been noticed in any individual, and in many instances none could be perceived even after treatment by reagents and staining-fluids.

The food consists chiefly of the smaller animalcules, the rhizopod *Trinema enchelys*, Leidy, and in several instances of small *Anquillule*, all of which were observed within the endoplasm, while an unsuccessful effort to swallow a large *Anquillula* was noted.

*Opisthotricha emarginata*, sp. nov. (Pl. XV. fig. 2.)

Body elongate, obovate, soft and flexible, depressed, about four times as long as broad, widest anteriorly, the frontal border rounded; somewhat tapering to the posterior extremity, the right-hand margin of which is conspicuously emarginate; peristome-field arcuate, narrow, without an inner or right-hand border, extending from the frontal margin for about one third the length of the body; eight frontal styles, six scattered setose ventral, and five large conspicuous anal ones; marginal setæ scarcely interrupted at the posterior extremity, more numerous on the right-hand border; caudal setæ three; several longitudinal rows of hispid setæ on the dorsal surface; nucleus double, ovate; contractile vesicle single, spherical, close to the left-hand border, near the posterior termination of the peristome. Length  $\frac{1}{260}$  to  $\frac{1}{175}$  inch.

*Hab.* Standing water, with aquatic plants. Reproduction by transverse fission.

In its movements this infusorian is rapid and erratic. Frequently after remaining comparatively quiescent, it suddenly darts backward entirely out of the field of the objective.

The contractile vesicle expels its contents through the dorsal surface, at complete systole forming there a conspicuously projecting elevation of the cuticular surface.

*Stylonychia notophora*, sp. nov. (Pl. XV. fig. 1.)

Body elliptical, more than twice as long as broad, the extremities subequal in breadth, the posterior one usually rounded and sometimes slightly emarginate on the right-hand side, the frontal border obtuse, the left-hand margin obliquely truncate, the right-hand corner obliquely emarginate, the upper lip prominent, crescentic; the inferior surface bearing eight frontal styles, the posterior three being smallest, and five ventral, with five anal, of the latter the three on the right-hand side projecting beyond the posterior border; marginal setæ conspicuous, interrupted at the posterior extremity, longest and most numerous on the right-hand margin; caudal setæ long, widely separated and inserted on the dorsal surface of the posterior extremity; peristome-field arcuate, extending to the centre of the ventral surface, its apical extremity terminating in a tubular ciliated pharyngeal passage sharply curved towards the right-hand side, the outer or left-hand border bearing the large adoral cilia, the right-hand margin finely ciliate and supporting a conspicuous undulating membrane; nucleus ovate, double; contractile vesicle single, spherical, on the left-hand side of the peristome, near its posterior extremity; anal aperture on the left-hand side of the dorsal surface, somewhat in advance of the position of the anal styles, the dorsum also bearing four longitudinal rows of immotile hispid setæ; all the styles as well as the marginal setæ occasionally fimbriated. Length of body  $\frac{1}{200}$  inch.

*Hab.* Standing water with dead leaves, or with various aquatic plants.

This differs from *Stylonychia mytilus*, Ehr., which, of all the species, it most resembles, in that the extremities are subequal in width, in the rounded posterior margin, beyond which project three instead of two anal styles, in the possession of the motionless bristle-like hairs on the dorsal surface, and especially in having the opening of the anal orifice on the superior or dorsal aspect. This, so far as I am aware, is only the second infusorian hitherto observed with the cytoppyge, or anal opening, debouching on the dorsum, the first to be noted being *Loxodes vorax*, Stokes\*, it being an interesting coincidence that both infusorians are members of the same order.

*Podophrya brachypoda*, sp. nov. (Pl. XV. fig. 4.)

Body subspherical or broadly pyriform, commonly rounded posteriorly, subsessile, the pedicle being very short and incon-

\* 'American Journal of Science,' July 1884, p. 38.

spicuous; tentacles distinctly capitate, often twice as long as the diameter of the body, arranged in two, three, or four fascicles; contractile vesicles two; nucleus ovate, coarsely granulate, subcentral or near the posterior extremity; endoplasm granular. Diameter of the body  $\frac{1}{600}$  to  $\frac{1}{750}$  inch.

*Hab.* Standing water with dead leaves; attached to fragments and débris.

So abundant in its habitat was this *Podophrya* that a single dip of a small glass rod brought to the microscope-stage a dozen or more attached to floating fragments in the bacterial pellicle. The foot-stalk is here so short and inconspicuous—no previously-observed *Podophrya* possessing so obscure a stem—that the infusorian may be recognized by this peculiarity. Unless seen in profile or side view, or in longitudinal optic section and attached to the supporting object, from which it is readily separated, it bears a not remote resemblance to *Sphaerophrya*. In the figure (Pl. XV. fig. 4) the pedicle is shown of extreme length, being the longest observed among innumerable individuals. Ordinarily it is not more than one half the length there represented. In young or immature forms—which were as plentiful in the infusion as the larger, more distinctly pedicellate specimens—the foot-stalk is so rudimentary that the animalcules seem to be quite sessile, and the posterior point of attachment to be somewhat indented, thus giving that part the aspect of an adhesive acetabuliform disk. The latter is said to be conspicuous in *Podophrya Buckei*, S. K., so named by Kent from its discoverer, who described it, but failed to supply a specific title; and Kent intimates that, on account of this peculiar modification at the point of attachment, the creature may hereafter become the type of a new genus. In view, however, of the disk-like aspect of the adhesive extremity in the young *P. brachypoda*, I would suggest that *P. Buckei* is probably an immature form of an unobserved, more distinctly pedicellate member of the present genus.

The embryo of the present species is elongate-ovate, about three times as long as broad, and very active. It has two contractile vesicles and a conspicuous ovate nucleus. I have been unable to follow the development, as all those seen to leave the parent have, within the confined space below the cover-glass, sooner or later fallen victims to the appetite of waiting *Podophryæ*.

*Solenophrya inclusa*, sp. nov. (Pl. XV. fig. 5.)

Lorica spheroidal, irregularly rounded or somewhat flattened posteriorly, bearing near the anterior border an irregular

equatorially-disposed rim or projection, close to which the thin walls are pierced by narrow fissures for the exit of the four to six fascicles of distinctly capitate tentacles; animalcule elongate-ovate or subspherical, entirely enclosed, not attached to the lorica posteriorly; contractile vesicle single; nucleus ovate, coarsely granular. Diameter of lorica  $\frac{1}{800}$  inch.

*Hab.* Standing water; attached to *Proserpinaca* and other aquatic plants.

The margin of the sheath in most of the loricate members of the order to which the genus *Solenophrya* belongs is usually difficult to demonstrate distinctly; but in this particular species the frontal convexity or roof is so hyaline that its existence can be satisfactorily observed only by the use of some chemical means of removing the enclosed zooid. This is readily accomplished by a drop or two of caustic potash in solution. The soft animal is thus entirely dissolved, the hyaline lorica remaining unchanged and in condition for examination. The lorica is then observed to be generally but irregularly spherical, the rounded contour being interrupted anteriorly by the conspicuous rim, the edge of which is also irregularly undulate and angular. The fascicles of tentacles seem to issue from fissures near this rim, as I have been unable to detect openings in the upper surface or dome-like roof of the lorica.

*Solenophrya pera*, sp. nov. (Pl. XV. fig. 6.)

Lorica irregularly cubical or satchel-shaped, compressed anteriorly, membranous, hyaline, the greatest height, length, and breadth subequal, longest and widest at the base of attachment, narrowing to the anterior border, the sides more or less concave, the sloping ends truncate, the posterior angles rounded, a narrow elongate cleft extending along the entire frontal margin; enclosed animalcule oval, about twice as long as broad, not adherent to the lorica posteriorly; tentacles numerous, capitate, arising from the entire frontal border; contractile vesicle single, posteriorly placed; nucleus conspicuous, subspherical, coarsely granular, located somewhat in advance of the pulsating vacuole. Length and height of lorica  $\frac{1}{600}$  inch, width  $\frac{1}{844}$ ; length of animal  $\frac{1}{750}$  inch, width  $\frac{1}{1200}$  to  $\frac{1}{1000}$  inch; two individuals often occupying the same lorica.

*Hab.* Standing water; attached to *Myriophyllum* and other aquatic plants.

The form of this lorica is so much like that of the ordinary hand-satchel now popular among ladies, that it suggested

the specific name. I have not observed the act of reproduction ; but the presence of two individuals in one lorica suggests fission or budding, the usual method in the order being by the formation of a ciliated embryo. In another remarkable undescribed species of this genus reproduction takes place by encystment and the subdivision of the entire body into biflagellate organisms. As I have thus far seen this form only in its encysted condition, I prefer to observe the arrangement of the tentacles before describing it.

*Acineta urceolata*, sp. nov. (Pl. XV. fig. 7.)

Lorica urceolate, widest and compressed anteriorly, the walls thin, readily taking the form of the enclosed animalcule, the posterior extremity continued as an attenuate, very short, hollow pedicle one eighth to one tenth as long as the lorica, the frontal margins separated by a narrow cleft-like fissure, widened and rounded at the lateral borders ; enclosed body almost filling the cavity of the lorica, and attached to it posteriorly by a prolongation continued through the pedicle ; endoplasm granular ; tentacles capitate, a fascicle issuing from each lateral angle of the anterior fissure ; nucleus oval ; contractile vesicle spherical, single. Length of lorica, including pedicle,  $\frac{1}{800}$  inch.

*Hab.* Standing water, with various aquatic plants. Trenton, New Jersey, U. S. A.

EXPLANATION OF PLATE XV.

- Fig. 1. Stylonychia notophora*,  $\times 480$ .
- Fig. 2. Opisthotricha emarginata*,  $\times 500$ .
- Fig. 3. Urostyla trichogaster*,  $\times 187$ .
- Fig. 4. Podophrya brachipoda*,  $\times 480$ .
- Fig. 5. Solenophrya inclusa*,  $\times 480$ .
- Fig. 6. Solenophrya pera*,  $\times 420$ .
- Fig. 7. Acineta urceolata*,  $\times 480$ .
- Fig. 8. Tillina flavicans*,  $\times 550$ .
- Fig. 9. Tillina inflata*,  $\times 550$ .
- Fig. 10. Lacrymaria truncata*,  $\times 280$ .
- Fig. 11. Anisonema emarginata*,  $\times 1000$ .
- Fig. 12. Entosiphon ovatus*,  $\times 900$ .
- Fig. 13. Colpidium truncatum*,  $\times 450$ .
- Fig. 14. Petalomonas carinata*. Transverse section  
Diagram.
- Fig. 15. Zygoselmis acus*,  $\times 1350$ .
- Fig. 16. Heteromita mutabilis*,  $\times 1200$ .
- Fig. 17. Forticella octava*,  $\times 600$ .